



# ICAO ENGINE EXHAUST EMISSIONS DATA SHEET

## SUBSONIC ENGINES

ENGINE IDENTIFICATION: Trent 1000-D  
UNIQUE ID NUMBER: 12RR057  
COMBUSTOR: Phase5 Tiled  
ENGINE TYPE: TF

BYPASS RATIO: 9.3  
PRESSURE RATIO ( $\pi_{00}$ ): 43.8  
RATED THRUST ( $F_{00}$ ) (kN): 334.7

REGULATORY DATA      \*\* DATA SUPERSEDED \*\*      SEE FOLLOWING UID FOR REVISED DATA:      12RR063

CHARACTERISTIC VALUE:	HC	CO	NO <sub>x</sub>	SMOKE NUMBER
D <sub>p</sub> /F <sub>00</sub> (g/kN) or SN	0.0	10.0	65.5	6.5
AS % OF ORIGINAL LIMIT	0.2	8.5	51.3	38.2
AS % OF CAEP/2 LIMIT (NO <sub>x</sub> )			64.2	
AS % OF CAEP/4 LIMIT (NO <sub>x</sub> )			69.2	
AS % OF CAEP/6 LIMIT (NO <sub>x</sub> )			75.7	
AS % OF CAEP/8 LIMIT (NO <sub>x</sub> )			84.3	

### DATA STATUS

- PRE-REGULATION  
x CERTIFICATION  
x REVISED (SEE REMARKS)

### TEST ENGINE STATUS

- NEWLY MANUFACTURED ENGINES  
x DEDICATED ENGINES TO PRODUCTION STANDARD  
- OTHER (SEE REMARKS)

### EMISSIONS STATUS

x DATA CORRECTED TO REFERENCE  
(ANNEX 16 VOLUME II)

### CURRENT ENGINE STATUS

(IN PRODUCTION, IN SERVICE UNLESS OTHERWISE NOTED)  
x OUT OF PRODUCTION (DATE: - )  
- OUT OF SERVICE (DATE: - )

### MEASURED DATA

MODE	POWER SETTING (%F <sub>00</sub> )	TIME (minutes)	FUEL FLOW (kg/s)	HC	CO	NO <sub>x</sub>	SMOKE NUMBER
TAKE-OFF	100	0.7	2.508	0.00	0.50	53.53	3.3
CLIMB OUT	85	2.2	2.048	0.00	0.48	39.98	3.8
APPROACH	30	4.0	0.668	0.00	0.65	13.77	3.9
IDLE	7	26.0	0.247	0.03	7.41	5.72	0.5
LTO TOTAL FUEL (kg) or EMISSIONS (g)			921	12	3138	20854	-
NUMBER OF ENGINES				4	4	4	4
NUMBER OF TESTS				8	8	8	8
AVERAGE D <sub>p</sub> /F <sub>00</sub> (g/kN) or AVERAGE SN (MAX)				0.0	9.4	62.3	6.0
SIGMA (D <sub>p</sub> /F <sub>00</sub> in g/kN, or SN)				0.0	2.5	0.8	2.3
RANGE (D <sub>p</sub> /F <sub>00</sub> in g/kN, or SN)				0-0.08	6.33-12.18	61.52-63.28	3-8.3

### ACCESSORY LOADS

POWER EXTRACTION 0 (kW)  
STAGE BLEED 0 (% CORE FLOW)

AT - POWER SETTINGS  
AT - POWER SETTINGS

### ATMOSPHERIC CONDITIONS

BAROMETER (kPa)	98.9-102.1
TEMPERATURE (K)	284.1-293.2
ABS HUMIDITY (kg/kg)	0.00432-0.00968

### FUEL

SPEC	
H/C	1.9
AROM (%)	17.4

MANUFACTURER: Rolls-Royce plc  
TEST ORGANIZATION: Rolls-Royce  
TEST LOCATION: Derby  
TEST DATES: 24/09/2009-03/08/2012

### NO<sub>x</sub> REGULATION PARAGRAPH

	2.3.2 c) (CAEP/4)
	2.3.2 d) (CAEP/6)
x	2.3.2 e) (CAEP/8)

### REMARKS

- Representative of Package B engines
- DNS170301
- Certification in accordance with Part III, Chapter 2, of Amendment 7 of ICAO Annex 16 Vol. II.
- NO<sub>x</sub> levels in accordance with Part III, Chapter 2, 2.3.2 e) (CAEP/8)

Compliance with Fuel Venting requirements: x ('x' if complies, 'PR' if pre-regulation, '-' if information is not available)